Impact of Flood on Socio-Economic Condition of the Farmers of Purnea District : A Geographical Study

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1) INTRODUCTION

“Floods are most recurring and frequent natural hazard causing enormous loss to life and livelihood, and damage to infrastructure. In India, Bihar is one of the worst affected states due to floods. Bihar is considered one of the poorest states in India, with historical and continued high poverty, unequal land distribution, upper-caste dominance and caste conflicts” (Rouyer,1994) “Persistent floods have acted as additional stressors amplifying many prevailing issues of social vulnerabilities”(Acharya & Prakash, 2019).

The Ganges divides Bihar into two sections, with rivers from the Himalayas flowing into parts of Northern Bihar, which are subject to extreme floods and subsequent casualties; while the southern part remains dry (Economic Survey 2019-20, Finance Department, Government of Bihar). Bihar has experienced the highest number of floods and related events in recent decades when compared to other Indian states. According to the Water Resource Department's Flood Management Information System in Bihar, approximately 73percent of the state is subject to annual recurring floods during the monsoons . Araria, Kishanganj, Madhubani, East Champaran, Sitamarhi, Sheohar, Supaul, Darbhanga, Muzaffarpur, Saharsa, Katihar, Purnia, and West Champaran are the worst-affected districts (Situation Report2019, NDM, Ministry of Home Affairs).

Flood has become synonymous with North-Bihar. Almost every year during the month of July-August, floods of different intensity occurs in North-Bihar. However, in some particular years, when there is a high amount of rainfall in Nepal Himalayan and Tarai region, massive floods occur. First such massive flood witnessed in 1954, followed by 1974, 1987, 1999, 2004 and the biggest among all in 2007-08.

The entire North-Bihar is crisscrossed by multiple rivers including Ghaghra, Gandak, Bagmati, Kamla-Balan, Kosi, Sone, Pun-pun and Mahananda. These rivers contribute to the devastating floods in North-Bihar. The major rivers flowing through Purnea districts are the Kosi, the Mahananda, the Suwara Kali and the Koli. The most disastrous among them is the river Kosi. It is because the river kosi is famous for frequently changing its course; therefore, it causes severe damage to lives, cattle, crops, infrastructures etc. It is famously known as the “Sorrow of Bihar”.

The paper begins with a thorough examination of the underlying causes and the corresponding statistical reports of loss and destruction caused by flood. The purpose of this research paper is to present a comprehensive analysis of both positive and negative socio-economic impact of flood in Purnea district and further present suggestions to overcome the challenges faced due to flood.

2) STATE - OF - THE - ART

Purnea district has a total geographical area of 3202 Km². The district is flanked by other four districts of Bihar. In the east lies Kishanganj, in the west Madhepura, in the north Araria and in the south Katihar.

Purnia lies in the fertile terai zone of the Gangetic Plains. The Ganges which originates from the Himalayan region, flows down and traverses through Purnia before eventually draining into the Bay of Bengal. The district falls in the extremely fertile alluvial zone of the river inundated with the fertile alluvium deposits. To the north of the city can be found the Kankar zone which is mainly composed of the big boulders from the Himalayas which are deposited here.

Purnea district is traversed by several rivers flowing from the Himalayas. Its major rivers are the Kosi, the Mahananda, the Kari kosi, the Saura and the Koli. In the west, the soil is thickly covered with sand deposited by changes in the course of the Kosi.

The Kosi River, also known as the Sorrow of Bihar, flows from the Himalayas, through Nepal's foothills, and into the alluvial plains of north Bihar before joining the Ganga . When heavy rains fall in central and eastern Nepal, the water from the mountains flows into the major watersheds of the Bagmati, Narayani, and, most importantly, the Kosi rivers, which then overflow into the plains and lowlands.

The Kosi, a trans-boundary river between Nepal and India is often referred to as the “Sorrow of Bihar”. The flow of the river contains excessive silt and sand, resulting in changing the courses of the river. During the past, the river has kept on changing its courses between Purnea district in the east and Darbhanga and Madhubani districts in the west. The recent disaster was created by the breach in the eastern Kosi embankment upstream of the Indian border at Kursela in the neighbouring Nepal on the 18th of August 2008. A tragedy of unparalleled dimension unleashed was over three million people living in 995 villages spreading in seven districts of Kosi region, viz. Supaul, Araria, Madhepura, Saharsa, Purnia, Khagaria and Katihar.

The disastrous impact of flood is evident from the following examples:

In 2007, the losses were unprecedented which caused the losses to 300 million worth of crops, 1183 people lives (officially declared), houses and the land. Thousands of people have become homeless, foodless and landless. It has affected 20 million people and 0.18 million ha land directly (NIDM Annual Report-2011, p-243). There was over 400% above to the normal rainfall within the short span which causes rivers to overflow.

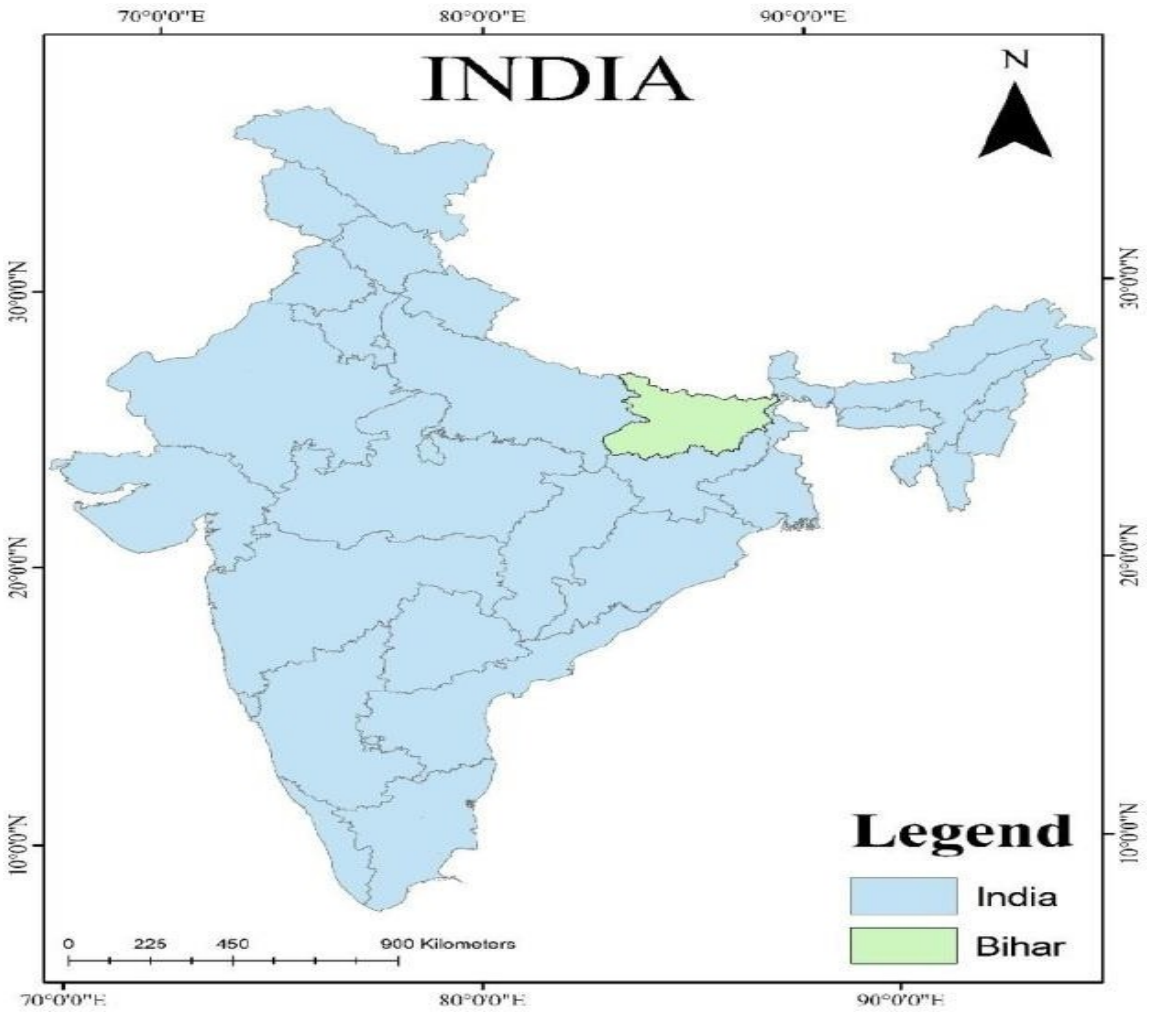
Thousands of acres of existing arable land become waterlogged, causing tremendous loss to crops. Livestock rearing has also been impacted as excessive water logging leads to limited

grazing land. Silt has also led to a shift in traditional crops as it leaves no water retention capacity in crops. The sheer amount of silt and uneven land due to the shifting of deposition of silt makes farming very difficult.

According to reports, “the sedimentation in Ganga in Bihar is primarily due to the massive sediment load contributed by its northern tributaries- Ghaghra, Gandak, and Kosi.”

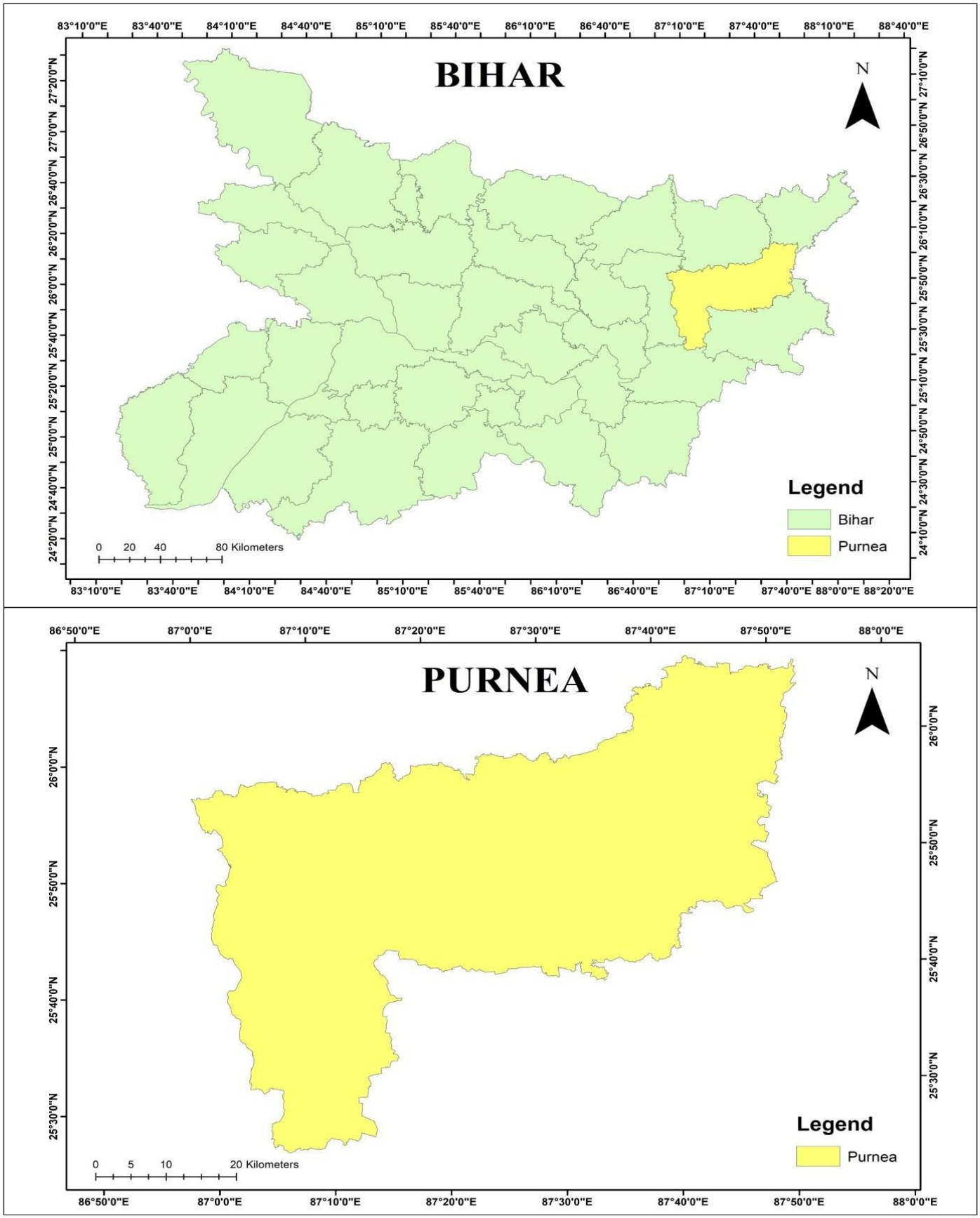
This research focuses on the adverse impact of flood on the socio-economic condition of farmers of Purnea district as flood leads to long term damage to agricultural sectors, livestock, housing, Water Resources (contamination and spread of diseases),loss of lives and property ,migration etc.

LOCATION MAP OF BIHAR STATE IN INDIA



SOURCE : ArcGIS

LOCATION MAP OF THE STUDY AREA



Contribution to the existing knowledge:

A brief review of some of the important works done earlier on this issue is discussed as below:

Gaurav Tripathi and Arvind Chandra Pandey in their article:
"Flood Hazard and Risk Zonation in North Bihar Using Satellite-Derived Historical Flood Events and Socio-Economic Data'', have presented the brief introduction of impact of flood and concluded that the central part of North Bihar region and preferably region along the rivers are having greater vulnerability which is further proved based on flood risk map. The flood risk map also showed that the central North Bihar region along the river was categorized in high to very high flood risk zone, affecting 6305 villages.

Rupak Kumar Jha and Haripriya Gunimeda in their journal :
"An integrated assessment of vulnerability to floods using composite index – A district level analysis for Bihar, India '' have found north Bihar highly vulnerable due to relative differences in exposure, sensitivity, and adaptive capacities and concluded Effective policy design must integrate the biophysical and social attributes into a comprehensive vulnerability assessments.

Bill Pritchard and Rebeka Thielemans in their work : "Rising Waters Don't Lift All Boats': a sustainable livelihood analysis of recursive cycles of vulnerability and maladaptation to flood risk in rural Bihar, India", have explained embankments as contributing to recursive cycles of vulnerability, in which women, children and poorer social segments have been unwitting bearers and this emphasises the need for climate adaptation initiatives to be anchored in a sustainable livelihood approach.

Subir Sen and Richa in their article : "Climate variability and migration in Bihar: An empirical Analysis", have discussed the increased frequency and severity of natural hazards which threaten rural livelihoods and the extant literature shows that communities exposed to repeated disasters resort to migration as an adaptation strategy and their study identifies that flood disaster is an important determinant for out-migration in Bihar.

Zaher Mundher Yaseen in his article "Flood hazards and susceptibility detection for Ganga river, Bihar state, India: Employment of remote sensing and statistical Approaches" has shown representative case study of Ganga River indicating Ganga River needs serious attention on flood hazard management and suggested Google Earth Engine , remote sensing and statistical methods for flood susceptibility detection.

Karthikeyan Matheswaran, Niranga Alahacoon, Rajesh Pandey & Giriraj Amarnath in their article "Flood risk assessment in South Asia to prioritize flood index insurance applications in Bihar, India have very widely described the socio-economic impact of flood and two statistical exploratory methods, k-means clustering and hot spot analysis were used to prioritize 37 districts in Bihar state into four flood risk zones namely low, moderate, high and very high for flood index insurance purposes.

3) PROBLEMS TO BE INVESTIGATED

Geographically, Nepal is a mountainous area. The Narayani, Bagmati, and Kosi rivers receive significant amounts of water when it rains heavily in Nepal's central and eastern mountains. The water subsequently increases in the rivers of Kosi, Mahananda, and other tributaries when it rains heavily in Nepal's central and eastern mountains. These rivers burst their banks when they enter India and flood into the plains of Bihar and lowlands of Purnea district. The floods results in a significant decline in the agricultural production base due to sediment deposition and loss of livestock, farm working capital and other current and non-current assets. Current assets includes: Expenses, grains, livestocks, fodder supplies of daily requirement, market and cash related problems . Non –current assets like machinery equipment, building and types of vehicle damage.

The impacts of floods affect various aspects of society, including income, education, agriculture, sanitation, and access to basic services. Floods result in unemployment and loss of livelihoods, as well as cause damage to infrastructure, leading to financial losses and displacement of populations. Additionally, floods can lead to the destruction of agricultural land, affecting food production and causing food insecurity.

Therefore, keeping in mind the above facts the present research will investigate the following problems:

i. What is the socio-economic impact of flood on farmers of the study area?
ii. To what extent traditional economic activities of farmers been impacted by the flood?
iii. What are the developmental programmes and policies run by the government in flood effected region?
iv. How far relief and response and rehabilitation measures contributed to Socio-economic development of local peasants?

4) OBJECTIVE OF THE INVESTIGATION AND MOTIVATION

Inspite of rich fertile loamy soil of alluvial formation present in Purnea area, farmers of this region is economically poor. Their social and economic conditions are at lowest .Above facts produces curiousity in the minds of researchers, to look around the factors responsible for such conditions of farmers.

By addressing the following research objectives, the study aims to provide comprehensive insights into the socio-economic impact of flood on the farmers of Purnea district:

i. To evaluate the impact of flood on socio-economic conditions of farmers of study area.
ii. To assess the changes in the traditional economic activities of the local peasants of the study area.

iii. To identify the problems faced by the farmers of the study area and bring out the potential solutions.
iv. To map the nature and extent of displacement and examine government strategies regarding rehabilitation.
v. To assess the health problems of flood prone area.

5) RESEARCH HYPOTHESIS.

i. The socio-economic conditions of local farmers are impacted by the flood.
ii. Flood leads to health related issues.
iii. Various relief and rehabilitation measures are taken by government for flood impacted peasants of the study area.

6) RESEARCH DESIGN AND METHODOLOGY

Socio-economic research is a study which generally involves analyzing the relationships existing between social and economic factors, which are a complex task. This work requires specific types of data and a systematic scientific research method. Therefore the presented research is based on a correlational research design in which quantitative and qualitative research methods will be used in a coordinated manner to demonstrate the impact of flood on the local farmers. Keeping in mind the outline and objectives of the study, mainly both primary and secondary data will be collected by taking the help of observation survey, questionnaire and interview research methods. After analyzing data related to the presented research study, the data will be tabulated and classified according to the objective of the study.The data will then be analyzed using scientific methods using various appropriate statistical tools and techniques. The conclusion after analyzing the data will be displayed using appropriate graphical methods.

- **SAMPLE DESIGN**
  Five blocks based on highest percentage of flood impact among the 14 blocks will be selected, further based on the same criteria, 5 villages from each 5 blocks will be selected and 25 households from each village will be sampled, generating a total sample of about 125 households. The sample`s dynamics will try to adhere to the characteristics of the population.

TENTATIVE CHAPTERISATION

Introduction

1) Geographical background.

2) Distribution and demographic profile of study area.

3) Impact of flood on livelihoods and economic activities of farmers.

4) Impact of flood on social structure and health condition.

5) Impact of flood on development programme and infrastructure.

6) A sample of 5 villages from each 5 blocks of flood prone area.

7) Role of governmental and non-governmental organizations in relief and rehabilitation.

8) Problems and suggestions to minimize the impact of flood on the study area .

Conclusion

References

7) SOURCES OF DATA AND TOOLS TO BE USED IN THECOLLECTION OF DATA

Keeping in mind the framework and objectives of the present study, generally both primary and secondary data will be used.

Primary sources: like Observation, Questionnaires method, Interviews, Schedules and Survey, Focus groups.

Secondary sources:

- Database provided by District office
- Government Report
- Data provided by relevant textbook
- Data provided by published/unpublished research thesis and journals
- District statistical handbook
- Toposheets

- GIS and remote sensing database comprising of land use and cover imageries
- Websites

8) ANALYSIS OF DATA

In the present research work, various types of statistical techniques will be used for critical analysis of data .At first, Microsoft Excel will be used for tabulation and classification of data.After this the data will be analyzed using IBM SPSS SOFTWARE and further ArcGIS will be used for the map .Appropriate statistical tools and techniques will be used to test the hypothesis. And hence, the known explicit information can be represented using various methods mainly bar graph, pie chart, line graph etc.

9) SIGNIFICANCE OF THE STUDY

Since many years the blocks of Purnea district have been facing the adverse impact of flood. So the research work will help to find out loop hole which exists among the government programmes, their implementation on the ground level and basic needs or demand of the affected population. The systematic study of the affected area will throw light on the impact of flood on farmers, livelihood, and habitats and why are they compelled to live in this area despite of all unavoidable dangers. This study will also provide some basic approaches for bringing out some alternate solutions to them.

10) RELEVANCE TO PRESENT DAY PROBLEMS AND NEED TO THE SOCIETY

Continuous devastating flood since many years has become a bane for the people of Purnea district .What it requires now is proper attention and due seriousness by the government officials. Reliving the locals of the impact of the flood could be done by collaborating with the government schemes and programs so that the locals are benefitted and also the objective of the program is achieved. Government can also address the issues of farmers impacted by flood. Rehabilitation and relief measures like alternate employment opportunities can be provided for the relocated people left with no work and vision, so that the coming generation of Purnea district lives in a hope for the better, safe and healthy future.

11) CONTRIBUTION TO EXISTING KNOWLEDGE

Various geographical surveys have been already done in flood areas of North Bihar. The present research will add a new chapter to the existing knowledge by studying socio-economic impact of flood on the farmers of the Purnea district . At the same time this research will present acomprehensive description of the socio-economic situation of the local peasants and hence it will help to reveal the various possible dimensions of development of this region.

12) FUTURE WORK

The present research work will serve as the basis for the following research work in the study area:

i. Local people and local government agencies can formulate some more efficient plan and programmes for dealing with flood induced displacement and rehabilitation in the area.
ii. Mental and psychological problems faced by the local farmers facing economic challenges due to loss of crops , property , lives and unemployment
iii. Regional planning and development programs and projects can be studied in this area.
iv. How anthropogenic causes have accelerated the natural disaster "FLOOD" .

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